



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,502	09/01/2006	Yuichiro Nakamura	OGOSH60USA	6549
270. 7590 11/19/2010 HOWSON & HOWSON LLP 501 OFFICE CENTER DRIVE SUITE 210 FORT WASHINGTON, PA 19034			EXAMINER SHEVIN, MARK L	
			ART UNIT 1733	PAPER NUMBER
			NOTIFICATION DATE 11/19/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary

Application No.

10/598,502

Applicant(s)

NAKAMURA ET AL.

Examiner

MARK L. SHEVIN

Art Unit

1733

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4 and 12-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4, 12, and 17 is/are allowed.
- 6) ☒ Claim(s) 1 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1, 4, and 12-17, filed September 17th, 2010 are currently under examination. Claims 4 and 17 have been amended and claims 2-3 and 5-11 are canceled.

Status of Previous Rejections

2. The previous rejections of claims 4, 12, and 17 under 35 U.S.C. 103(a) over **Bartholomeusz** (US 6,521,062) in view of **Yamakoshi** (US 6,153,315) in the Office action dated June 17th, 2010 have been withdrawn in view of the amendments to claims 4 and 17.

3. The previous rejection of claim 11 under 35 U.S.C. 103(a) over **Bartholomeusz** in view of **Yamakoshi** in further view of **Tamura** (US 6,024,852) in the Office action dated June 17th, 2010 has been withdrawn in view of the cancellation of claim 11.

Claim Rejections - 35 USC § 103

4. Claims 1 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bartholomeusz** (US 6,521,062) in view of **Yamakoshi** (US 6,153,315). The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Regarding claim 1, Bartholomeusz is drawn to the production of cobalt-base alloy sputtering targets (claims 1 and 12 and 13 and col. 2, lines 50-58) with primary elemental additions of Cr, Pt, Ni of 0 – 30 at% and secondary elemental additions such

as Ta, B, Nb, Sm, Fe, Si, Zr, W, Mo, V, Hf, and Ti of 0 – 30 at%, such as alloys comprising Co, Cr, Pt, and B (claims 7, 8, 17, 18, and 19).

Such cobalt-base alloys can be very difficult to roll if the concentration of limited solid-solubility elements is excessive (col. 1, lines 19-30). As more Ta and B are added to the Co-Cr-Pt-B-Ta matrix studied by Bartholomeusz, the intermetallic precipitates became less dispersed and more continuous as expressed by the metric (continuity) of volume percent discontinuous intermetallic phases divided by the number of free nodes of these phases (col. 3, lines 58-65).

Beyond a certain continuity, continuous and brittle intermetallic phase networks form leading to fracturing during hot-rolling due to ready crack propagation along the intermetallic network (col. 3, line 65 to col. 4, line 4).

Bartholomeusz solves this problem of brittle interconnected intermetallics by casting and rolling to produce grain sizes of about 20 μm and precipitate sizes of about 1 μm (col. 4, lines 4-13). His process is embodied in claim 1 and col. 5, line 60 to col. 6, line 5 and yields average product grain sizes of less than 100 μm , average product precipitate size of less than 50 μm , with no significant through thickness grain-size or precipitate size gradient, theoretical density, high pass through flux of greater than 20%, and substantially homogenous microstructural (col. 6, lines 14-25 and claim 1).

Bartholomeusz discloses sputtering targets (claims 1 and 12 and 13 and col. 2, lines 50-58) of at least Co, Cr, Pt, and B (claims 7, 8, 17, 18, and 19) having a target surface prepared by melting, casting, and rolling (col. 6, lines 14-25 and claim 1) in

which intermetallic compounds or other substances without ductility exist (col. 3, line 65 to col. 4, line 4 and col. 4, lines 4-13).

With respect to the average particle diameter being at least 0.5 μm to 50 μm , Bartholomeusz teaches that the average product precipitate size produced by his method is less than 50 μm (col. 6, lines 14-25), which overlaps the claimed range.

However Bartholomeusz is silent with respect to the presence of oxides, carbides, and carbonitrides, the matrix being a highly ductile phase, the volume percentage of precipitates of 1% to 50%, the Vickers hardnesses of the matrix and other substances without ductility and the attendant hardness difference of the two.

From the instant specification, the instant target with the features of oxides, carbides, and carbonitrides, the matrix being a highly ductile phase, the volume percentage of precipitates of 1% to 50%, the Vickers hardnesses of the matrix and other substances without ductility and the attendant hardness difference of the two is manufactured by dissolution and rolling (p. 7, lines 15-20, p. 9, lines 1-6 and 17-22) - (cutting with a lathe and latter polishing do not form the claimed sputtering target precipitate structure of claim 1). Dissolution is considered to be casting.

Bartholomeusz's sputtering targets are of a substantially similar composition (comprising Co, Cr, Pt, and B) and are produced by a substantially similar process in being cast (col. 5, lines 60-65) and then rolled (col. 6, lines 3-5).

Thus, one of ordinary skill in sputtering target manufacturing would have reasonably expected that Bartholomeusz produces Co-Cr-Pt-B sputtering targets that meet the claimed limitations of claim 1 regarding the presence of oxides, carbides, and

carbonitrides, the matrix being a highly ductile phase, the volume percentage of precipitates of 1% to 50%, the Vickers hardnesses of the matrix and other substances without ductility and the attendant hardness difference of the two because Bartholomeusz's sputtering targets are of a substantially similar composition (comprising Co, Cr, Pt, and B) and are produced by a substantially similar process in being cast (col. 5, lines 60-65) and then rolled (col. 6, lines 3-5).

It would have been obvious to one of ordinary skill in sputtering target manufacturing, at the time of the invention, to select any portion of the claimed range of average precipitate size, including the claimed range, from the overlapping range disclosed in Bartholomeusz because Bartholomeusz finds that the prior art composition in the entire disclosed range has a suitable utility and the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). From MPEP § 2144.05: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With respect to the amendment to claim 1 adding "...casting...cutting and polishing", Bartholomeusz discloses casting (col. 4, lines 50-67, col. 5, lines 5-10) while the claimed processing steps of cutting and polishing as not considered to yield a

patentable distinction product from that disclosed by Bartholomeusz in terms of final structure. (see MPEP 2113).

However, with respect to the limitation of “wherein defects of 10 μm or more resulting from machine work do not exist”, Bartholomeusz discloses machining work of cutting the sputtering target from rolled plate (Abstract, claims 12 and 13) which would be considered to create defects of the type barred by instant product claim 1.

Yamakoshi, drawn to a method of manufacturing a sputtering target which provides excellent uniformity in film thickness and low incidence of occurrence of nodules and particles (col. 1, lines 5-10), teaches that variation in film thickness and the production of particles and nodules are all attributable to conditions of the target surface (col. 1, lines 23-40) and it is necessary to reduce the thickness of a surface damage layer produced by machining to 15 μm or less and the surface roughness to 0.2 μm or less by precision machining of the surface with a diamond turning tool followed by polishing (col. 2, lines 1-21, col. 4, line 66 - col. 5, line 2) to reduce sputtered films more even and to reduce the number of nodules and particles released during sputtering (col. 2, lines 45-56).

Thus, it would have been to one of ordinary skill in the art, the time of the invention, to remove the surface damaged layers resulting from the cutting process of Bartholomeusz in order to reduce both the surface roughness and the thickness of surface damaged layers to achieve more even sputtered films and reduced particles generated during sputtering (col. 2, lines 45-56).

With respect to "defects of 10 μm or more", the process of reducing the thickness of surface damaged layers to 15 μm thickness or less (col. 4, lines 51-58) is considered to overlap the claimed range and it would have been obvious to one of ordinary skill in the art, to select any portion of the claimed range, including the claimed range, from the overlapping range disclosed in Yamakoshi because Yamakoshi finds that the prior art final surface damage layer thickness in the entire disclosed range has a suitable utility and the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages and in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation (MPEP 2144.05, section I, para 1 and section II, A, para 1)

Regarding claims 13-16, these claims are rejected for the same reasons as stated for claim 1 above.

With respect to said surface providing "...a flat and smooth target face without undulation", the prior art of Bartholomeusz would similarly be expected to have a "flat and smooth target face without undulation" as Bartholomeusz is produced by a substantially similar process including casting and rolling and such rolling would be expected to give a flat and smooth surface without undulation. Similarly, the lathe machining process of Yamakoshi would similarly be expected to yield a flat surface without undulation as Yamakoshi sought to minimize surface roughness.

With respect to the amendment to claim 13 adding "...casting...cutting and polishing", this amendment is does not overcome the rejections over Bartholomeusz for the same reasons as stated for the rejection of claim 1 above.

Allowable Subject Matter

5. **Claims 4, 12, and 17** are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to independent claims 4 and 17, Bartholomeusz, Yamakoshi, and Tamura disclosed all of the claimed steps except for the final processing step, now limited to the recited final step of polishing 1 μm to 50 μm from the target surface with sandpaper or a grindstone of #80 to #400 grit. The prior art teaches away from this final processing step in requiring several additional polishing steps using #600 and 1200# alumina to produce a mirror finish, which are excluded by the final processing step's use of the "consisting of" preamble.

Response to Applicant's Arguments:

6. Applicant's arguments filed September 17th, 2010 have been fully considered but they are not persuasive.

Applicants assert (p. 8, para 1-4) that "...while the sputtering target alloy of Bartholomeusz may contain similar components, the properties of the alloy of Bartholomeusz are different than that of the present invention, and thus, the

compositions are not "substantially similar" as the instant sputtering target is rollable while Bartholomeusz is disclosed as not being rollable or as needing additional processing steps before being rollable.

In response, Applicants have not pointed out distinctive structural differences in the final sputtering target product as claimed. Whatever the work needed to render the material of Bartholomeusz rollable, the sputtering targets of Bartholomeusz were in fact produced by melting, casting, and rolling (col. 6, lines 14-25 and claim 1). What structural distinction is present in the final product, as claimed, as a result of the sputtering target being "rollable without the need for any processing steps or thickness/width limitations"?

Applicants assert (p. 9, para 2-4) that Yamakoshi fails to disclose the specific type of polishing required by the present invention to produce the claimed surface defect limitations as all Yamakoshi disclosed methods of lathe machining, diamond-finishing machining, wet polishing, or chemical polishing are different from polishing with a sandpaper or a grindstone having a grit of #80 to #400.

In response, the Examiner disagrees in that while Bartholomeusz disclosed machining work to cut the sputtering target from rolled plate, Yamakoshi disclosed polishing operations specifically designed to remove a surface damage layer of the claimed thickness (and also produced by machining work) in order to improve the sputtering process by reducing nodules and particles released during sputtering (see p. 6, para 1 of the Office action mailed 06/17/2010 and Yamakoshi, col. 1, lines 23-40, col. 2, lines 1-21 and 45-56, col. 4, line 66 - col. 5, line 2). Again, Applicants have not

pointed out specific, distinctive structural distinctions in the target surface as claimed compared to the target surface of Bartholomeusz in view of Yamakoshi.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

-- Claims 1 and 13-16 are finally rejected
-- Claims 4, 12, and 17 are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since

Art Unit: 1733

other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday-Friday, 8:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King, can be reached at (571) 272-1244. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1733

November 11th, 2010
10-598,502

/George Wyszomierski/
Primary Examiner
Art Unit 1733